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ABSTRACT:

PURPOSE: To obtain a structure material excellent in molding workability, water resistance, heat resistance and weather resistance and useful as an interior automotive trim, etc., by mixing a porous material with a sulfomethylated compound of a specific cocondensation polymer and subjecting to heat-molding and curing processes.

CONSTITUTION: This objective structure material is obtained by mixing (A) a porous material with (B) a sulfomethylated compound of a cocondensation polymer of a methylol group-containing monovalent phenol-aldehyde condensate with a polyhydric phenol (-aldehyde condensate), subjecting this mixture to melt-molding process and subsequently curing the molded article. Further, in the objective structure material, the component A is preferably a plastic formed- material or a fiber aggregate and a part or the total of the polyhydric phenol used as the component B is preferably alkyl resorcin.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] this invention relates to the structure material used for the interior material of vehicles, such as an automobile, a building material, etc.

[0002]

[Description of the Prior Art] While phenol resin is mixed as a binder to a synthetic fiber, a glass fiber, woody fiber, etc. and hot forming is carried out to a predetermined configuration as this kind of structure material, the thing which made this phenol resin harden is offered conventionally.

[0003]

[Problem(s) to be Solved by the Invention] However, the curing temperature of the phenol resin as a binder was an elevated temperature below and over 200 degrees C, is difficult to mold simultaneously in piles mounting material bad the luminous efficacy of heat energy in a manufacturing process and lacking in the thermal resistance like the poly-polyvinyl chloride leather and polypropylene nonwoven fabric which are used as the object for designs, or an object for mounting etc. by heating under pressure, and had a possibility that fiber etc. might deteriorate with the elevated temperature at the time of molding. Furthermore, the hardened material of phenol resin was too hard, and had a brittle defect.

[0004] For this reason, it was a very important technical problem for a **** advantage to be acquired if it will lead also to a cost cut of structure material by having the flexibility with the moderate hardened material which hardens at low temperature comparatively and is obtained as a result, and having rigidity if there is a binder with a moderate cure rate and a moderate working life, and sticking by pressure of mounting material and molding of structure material can be performed simultaneously, and to find out such an effective binder.

[0005]

[Means for Solving the Problem] While this invention mixes the sulfo methylation object of the copolycondensation object with 1 ** phenolaldehyde condensate, the polyhydric phenol and/or the polyhydric phenol, and aldehyde condensate which has a methylol machine in a porous material and it carries out hot forming to a predetermined configuration as a means for solving the above-mentioned conventional technical problem, the structure material which made this condensate harden is offered.

[0006] this invention is explained in detail below.

<< sulfo methylation object >>

1 ** phenol used for condensation with the aldehyde in [** 1 Phenol] this invention Alkylphenols, such as a phenol, o-cresol, m-cresol, p-cresol, ethylphenol, iso-propyl phenol, a xylanol, 3, 5-xylanol, butylphenol, t-butylphenol, and a nonyl phenol, o-fluorophenol, m-fluorophenol, p-fluorophenol, o-chlorophenol, m-chlorophenol, p-chlorophenol, o-***** phenol, m-***** phenol, p-***** phenol, o-iodine phenol, m-iodine phenol, p-iodine phenol, ortho aminophenol, m-aminophenol, para aminophenol, ortho nitrophenol, m-nitrophenol, p-nitrophenol, a 2, 4-dinitrophenol, 2, 4, A kind of 1 ** phenols, such as 1 ** phenol substitution products, such as 6-trinitrophenol, and a naphthol, or two sorts or more of mixture is said.

[0007] As a polyhydric phenol used for a [polyhydric-phenol] this invention, although it is a kind of polyhydric phenols, such as a resorcinol, an alkyl resorcinol, pyrogallol, a catechol, an alkyl catechol, hydroquinone, alkyl hydroquinone, a phloroglucine, a bisphenol, and dihydroxy naphthalene, or two sorts or more of mixture, a desirable thing is a resorcinol or an alkyl resorcinol among these polyhydric phenols, and especially a desirable thing is an alkyl resorcinol with the reaction rate quicker than a resorcinol with an aldehyde. As the above-mentioned alkyl resorcinol For example, 5-methyl resorcinol, 5-ethyl resorcinol, 5-propyl resorcinol, a 5-n-butyl resorcinol, 4, 5-dimethyl resorcinol, 2, 5-dimethyl resorcinol, 4, 5-diethyl resorcinol, 2, 5-diethyl resorcinol, 4, 5-dipropyl resorcinol, There are 2, 5-dipropyl resorcinol, a 4-methyl-5-ethyl resorcinol, a 2-methyl-5-ethyl resorcinol, a 2-methyl-5-propyl resorcinol, 2 and 4, a 5-trimethyl resorcinol, 2 and 4, a 5-triethyl resorcinol, etc. Since the polyhydric-phenol mixture obtained by dry distillation of the Estonia ** oil shale contains various reactant high alkyl resorcinols besides 5 ***** resorcinol so much cheaply, it is the most desirable polyhydric-phenol raw material to this invention.

[0008] As the aldehyde used for a [aldehyde donator] this invention, and/or an aldehyde donator They are an aldehyde and the compound which will carry out generation supply of the aldehyde if it decomposes. Formalin, formaldehyde, a

paraformaldehyde, a trioxane, an acetaldehyde, a propionaldehyde, a polyoxymethylene, a trichloroacetic aldehyde, a hexamethylenetetramine, a furfural, glyoxal, n-butylaldehyde, a caproaldehyde, It is an allyl-compound aldehyde, the Benz aldehyde, a crotonaldehyde, an acrolein, a tetrapod oxy-methylene, a phenylacetaldehyde, o-torr aldehyde, a salicylaldehyde, etc., and these are used as a kind or two sorts or more of mixture.

[0009] In the case of the copolycondensation with the initial condensate of 1 ** phenolaldehyde, the polyhydric phenol and/or the polyhydric phenol, and the initial condensate of an aldehyde obtained according to condensation with 1 ** phenol, an aldehyde, and/or an aldehyde donator, or the above-mentioned condensation, addition use of the alkali catalyst is carried out in a [alkali catalyst] this invention. As the above-mentioned alkali catalyst, hydroxides, such as alkali metal and alkaline earth metal, an oxide, a carbonate, an amines, etc. are used, and caustic alkali of sodium, a caustic potash, a barium hydroxide, a calcium hydroxide, sodium carbonate, lime, sodium sulfite, ammonia, a trimethylamine, a triethylamine, a hexamethylenetetramine, a pyridine, etc. are illustrated. To the weight of a phenols, the addition of a catalyst is several percent or less, and is usually added in 6% or less of an amount.

[0010] As a sulfo methylation agent used in a [sulfo methylation agent] this invention, hydroxy alkane sulfonic acids, such as a water-soluble sulfite with quaternary amines, such as a sulfuric acid, a pile sulfuric acid or a meta-pile sulfuric acid, alkali metal or a trimethylamine, and benzyl trimethylammonium, or the fourth class ammonium and hydroxy methanesulfon acid chloride obtained by the reaction of these water-soluble sulfites and aldehydes, are illustrated. This water-soluble sulfite reacts with the methylol machine of the copolycondensation object (C) with the initial condensate (A) of 1 ** phenolaldehyde, a polyhydric phenol and/or a polyhydric phenol, and the initial condensate (B) of an aldehyde, forms a hydroxy alkane sulfonate with an aldehyde first in response to the time of generating a sulfo methyl group or making the above-mentioned condensate (A) and/or an initial condensate (B) condense, subsequently reacts with a phenol, and generates a sulfoalkyl machine. Therefore, hydroxy alkane sulfonates, such as hydroxy methanesulfon acid chloride, can also be used as a sulfo methylation agent instead of a water-soluble sulfite. The addition of a sulfo methylation agent is usually 0.001-1.5 mols to one mol of 1 ** phenols.

[0011] In a [complexing-agent] this invention, you may add the complexing agent which mitigates the reactivity of a polyhydric phenol and an aldehyde in the case of the copolycondensation reaction of a copolycondensation object (C) in the case of the condensation reaction of an initial condensate (B). The compound which has a ketone group or an amide group etc. which has complexing organization potency to the hydroxyl of a polyhydric phenol as such a complexing agent is raised, for example, an acetone, a caprolactam, etc. are illustrated, and especially an acetone is a desirable complexing agent. Although especially a limit does not have the addition of a complexing agent, about 0.4-0.8 mols of complexing agents are usually desirable to the polyhydric phenol of one mol.

[0012] In a [third-component] this invention in addition to 1 ** phenol, a polyhydric phenol, an aldehyde donator, a sulfo methylation agent, a condensation catalyst, and a complexing agent as a third component a request -- if -- a urea, a melamine, thiourea, benzoguanamine, toluene, a xylene, a cumarone, a cyclohexanone, cashew oil, tannin, ******, a shellac, rosin or a rosin derivative, a petroleum resin, a methanol, ethanol, and an isopropanol -- Kinds, such as n-butanol, an isobutanol, ethylene glycol, a diethylene glycol, a polyethylene glycol, a glycerol, fufuryl alcohol, the linseed oil, tung oil, and castor oil, or two sorts or more are made into a copolycondensation agent or a modifier. At the time of reaction start of condensation or a copolycondensation Among a reaction or after a reaction end, it adds, and even if it denaturalizes, it does not interfere.

[0013] Although the indifferent water is used as a solvent at the time of the reaction of a [solvent] this invention, if required, the addition use of that water fusibility organic solvents, such as ketones, such as alcohols, such as a methanol, ethanol, an isopropanol, n-butanol, ethylene glycol, a diethylene glycol, and a polyethylene glycol, an acetone, and a methyl ethyl ketone, are still independent or two or more sorts of mixture can be carried out. While an acetone etc. is a solvent, it acts also as a complexing agent of an alkyl resorcinol, and brings a quieter reaction.

[0014] In a [condensation-reaction and sulfo methylation reaction] this invention, condensation is carried out in two phases. In the first condensation phase, if required for one mol of 1 ** phenols, an aldehyde, and/or 1-4 mols of aldehyde donators, a solvent and a third component will be added, an alkali catalyst is added, pH is prepared to 8-11, a pyrogenetic reaction is carried out at 55-100 degrees C of solution temperature for 8 to 15 hours, and the initial condensate (A) of 1 ** phenolaldehyde which has a methylol machine is obtained. At this time, the whole quantity, in addition ** of an aldehyde and/or an aldehyde donator are good at the time of reaction start, and they may carry out split addition or continuity instillation. In the 2nd phase of condensation, a polyhydric phenol and/or a polyhydric phenol, and the initial condensate (B) of an aldehyde are added to the initial condensate (A) of the 1st phase, if still required, an aldehyde and/or an aldehyde donator, a solvent, a complexing agent, and a third component will be added, a pyrogenetic reaction is carried out for 1-6 hours at 60-110 degrees C of pH eight to 11 solution temperature, and a copolycondensation object (C) is obtained. In order for the total amount of the polyhydric phenol added here to be usually 0.01-3 mols and also to carry out [as opposed to / one mol of 1 ** phenols / in order to improve the solubility of a copolycondensation resin or to aim at retardation of a cure rate] a room temperature setting with an aldehyde curing agent, it is usually 0.5 mols or more desirably 0.2 mols or more. Moreover, the polyhydric phenol and the initial condensate of an aldehyde (B) used for a copolycondensation reaction are initial condensates which will add a solvent, a complexing agent, and a third component to the polyhydric phenol of one mol if required of the rate of 0.1-0.7 mols of aldehyde donators in addition, carry out a pyrogenetic reaction for 1-10 hours at 60-110 degrees C of pH eight to 11 solution temperature, and are obtained. Sulfo methylation is performed [in / condensation with 1 ** phenol of the 1st phase, an aldehyde, and/or an aldehyde donator] in condensation with a polyhydric phenol, an

aldehyde, and/or an aldehyde donor in the copolycondensation with the initial condensate of 1 ** phenolaldehyde of the 2nd phase (A), a polyhydric phenol and/or a polyhydric phenol, and an aldehyde condensate (B) by adding and carrying out the pyrogenetic reaction of the sulfo methylation agent before a condensation reaction or in a condensation reaction, and after a condensation reaction. However, since sulfo methylation in this phase has [especially in the case of the polyhydric-phenol condensate without a methylol machine] a possibility of reducing the functionality with little polyhydric phenol further in the case of an alkyl resorcinol, it is not desirable technique. sulfo methylation -- usually -- one mol of phenols -- receiving -- a sulfo methylation agent -- although carried out by 1.5 mols or less, in order to hold performances, such as the hardenability of the initial copolycondensation object after condensation, and the physical properties of the resin after hardening, good, it is desirable that the addition of a sulfo methylation agent is about 0.01-0.8 mols Thus, the part and sulfo methylation agent of a methylol machine of 1 ** phenol, a polyhydric phenol, and the initial copolycondensation object (C) of an aldehyde react, or when a sulfo methylation agent is a hydroxy alkane sulfonate, it reacts with a part of phenol of this copolycondensation object (C), and a sulfo methyl group is formed.

[0015] If addition mixture of the curing agent 1 which becomes 100 weight section of 1 ** phenol, the polyhydric phenol, and the initial copolycondensation object of an aldehyde (C) with which sulfo methylation of the [hardening of initial copolycondensation object by which sulfo methylation was carried out] this invention was carried out from an aldehyde like para ***** and/or an aldehyde donor, - the 80 weight section is carried out, a room temperature setting will be carried out in all the fields of pH. The cure rate becomes slow compared with the initial copolycondensation object with the same structure by which sulfo methylation is not carried out, and a working life extends. If a ***** time copolycondensation object (C) needs to be hardened, it can also perform it under heating, and high-frequency heating is an especially effective means. If in heating hardening it compares with the polyhydric-phenol component in this first time copolycondensation object (C) and enough methylol machines exist, the curing agent which consists of an aldehyde and/or an aldehyde donor does not necessarily need to be added. When an aldehyde donor is stable in ordinary temperature like a hexamethylenetetramine, it is necessary to heat more than the decomposition temperature. Moreover, in this invention, even if it adds an acid or alkaline curing catalyst in the case of hardening, it does not interfere. If required in the case of hardening, furthermore, amino resins, such as 1 ** phenol system resin, a polyhydric-phenol system resin, a urea system resin, and a melamine system resin, Synthetic rubber, such as natural rubber and its derivative, a styrene butadiene rubber, acrylonitrile-butadiene rubber, chloroprene rubber, ethylene-propylene rubber, polyisoprene rubber, and isoprene-isobutylene rubber, The homopolymer of vinyl monomers, such as vinyl acetate, a propionic-acid vinyl, styrene, acrylic ester, methacrylic ester, acrylonitrile, an acrylic acid, a methacrylic acid, a maleic acid, a vinyl chloride, a vinylidene chloride, and a vinylpyridine Or two or more sorts of copolymers of these vinyls monomer, The emulsion, the latex, or the aqueous solutions of various synthetic resin, such as polyurethane, a polyamide, an epoxy resin, a butyral resin, polyethylene, polypropylene, a vinyl acetate-ethylene copolymer, a chlorinated polyethylene, chlorination polypropylene, and polyester, Moreover, water soluble polymers and natural gums, such as polyvinyl alcohol, a sodium alginate, a starch, a starch derivative, glue, gelatin, powdered blood, a methyl cellulose, a carboxymethyl cellulose, a hydroxyethyl cellulose, a polyacrylate, and a polyacrylamide, Furthermore, bulking agents, such as carbonic acid calcium, talc, plaster, carbon black, wood flour, walnut powder, coconut shell powder, a wheat flour, and rice powder, A pigment, a color, a flame retarder, a flame proofing agent, Additives, such as plasticizers, such as a ***** acid ester system plasticizer like an insecticide, antiseptics, an antioxidant, an ultraviolet ray absorbent, DBP, DOP, and a dicyclohexyl free-wheel-plate rate and other tricresyl phosphate, are added to this condensate. You may make this copolycondensation object denaturalize by the copolycondensation, mixture, etc.

[0016] <<structure material>>

As a porous material used for a [porous-material] this invention A polyester fiber, aliphatic series or aromatic-polyamide fiber, an acrylic fiber, Polyolefine fiber, vinylidene fiber, polyvinyl chloride fiber, a polyurethane fiber, Chemical fibers, such as a Vynylon, rayon, cuprammonium rayon, and acetate, pulp, Woody fiber, such as a piece of wood, the felt, the regeneration felt, cotton, palm fiber, sheep wool, Organic fiber, such as a natural fiber or the above-mentioned chemical fibers, such as silk, and a regenerated fiber of a natural fiber, The curdy field which carried out the carding of the fiber, such as inorganic fibers, such as a glass fiber, rock wool, a ceramic fiber, and a carbon fiber ***** which *****ed this fiber by the **** machine or needle punch, the paper-milling field which milled the slurry containing this fiber, A natural rubber foam, such as a knit fabric which knit and wove this fiber, and a nonwoven fabric, a synthetic-rubber foam, A polyurethane foam, a polyethylene foam, a polypropylene foam, There are the plastics foam and wood like an amino resin foam like a polyvinyl chloride foam, a phenol resin foam, a melamine resin foam, and a urea-resin foam, paper, a board, corrugated paper, fiber board, particle board, a plywood, etc. The above-mentioned instantiation does not limit this invention.

[0017] Although it may be used as a laminating porous material which these porous materials may be used independently or carried out the laminating of the congener or this porous material of a different kind more than two-layer, when it is the composite material which piled up the reinforcing materials between layers further in the case of both sides of a porous material, one side, or the laminating porous material, the intensity as structure material, frictional resistance nature, weatherability, an appearance, etc. improve further, and it is desirable.

[0018] to a [reinforcing materials] this invention, it is alike and sets, and the reinforcing materials may be used in order to reinforce the above-mentioned porous material As the above-mentioned reinforcing materials, there are metal goods, such as the above-mentioned organic one, the knit fabric of an inorganic fiber and a nonwoven fabric, a cheesecloth, the mesh field like a wire gauze, a metal frame, and a metal plate, used paper, a plastics sheet, etc.

[0019] In order to manufacture the structure material of a [manufacture of structure material] this invention the sulfo methylation object of the copolycondensation object with 1 ** phenolaldehyde condensate, the polyhydric phenol and/or the polyhydric phenol, and aldehyde condensate which has this methylol machine in this porous material -- a request -- if -- an additive which was described above -- mixing -- further -- a request -- if -- curing agent ***** -- a formaldehyde donator -- The mixture which mixed the acid catalyst, the alkali catalyst, etc. A spray, a roll coater, It carries out application sinking in by immersing etc., or in the case of fiber, this powder-like sulfo methylation object is mixed at the time of carding or *****, or, in paper milling, it adds the fine particles or the solution of this sulfo methylation object to a fiber slurry. Since this laminating porous material carries out application sinking in of this mixture and the porous material of a monolayer carries out application sinking in of this mixture when using a laminating porous material, you may carry out a laminating. After sinking this mixture into this porous material, a stoving is carried out and it is still good also as a prepreg which made a room temperature or the this mixture into which it sank harden a little.

[0020] Furthermore, in compounding the reinforcing materials with both sides or one side of this porous material, before this porous material carries out application sinking in of this mixture, this reinforcing materials may be compounded with this porous material, and after putting the reinforcing materials on this porous material, it carries out application sinking in of this mixture. Moreover, it may carry out application sinking in of this mixture, and both may be compounded with this porous material after that. Although a binder, hot melt adhesive, usual adhesives, etc. are used for sticking this reinforcing materials on this porous material, especially adhesives are unnecessary when making this reinforcing materials carry out application sinking in of this mixture.

[0021] moreover, about that to which a swelling etc. happens when a porous material sinks into what has a comparatively weak intensity, or a solution to tensile strength, such as urethane, glass wool, and the felt If it carries out application sinking in of this mixture after sticking this porous material and this reinforcing materials with adhesives etc. beforehand There is neither a gap with this porous material and this reinforcing materials nor peeling at the time of application sinking-in work. Moreover, when mixture is a solution, it is lost that a gap, peeling, etc. arise when this porous material and this reinforcing materials swell with this solution, a continuous operation is possible, even when drying by the case again, occurrence of a gap, peeling, etc. is especially lost, and it is desirable.

[0022] Moreover, even when change the directivity of fiber and it compounds, when compounding this reinforcing materials with this porous material and the reinforcing materials consist of the fiber matter, and compounding this porous material more than two-layer, of course, it is possible to change a directivity similarly and to compound, and it leads also to the enhancement in the intensity of structure material further in this case.

[0023] furthermore -- the case where application sinking in of this mixture solution is carried out in order to have fabricated such porous materials and composite material -- as it is -- or it is, immediately after making it dry to a suitable moisture content -- it is -- a hot press is performed continuously, without cutting into a predetermined configuration or cutting, after carrying out a required term store Furthermore, as long as it is required, as the object for designs, or an object for mounting, the mounting material to use is compounded, and a hot press may be carried out simultaneously and you may fabricate. Moreover, after carrying out the heat-and-pressure press forming of this composite material, you may compound the reinforcing materials or/, and mounting material. Usually let mixture or the sinking-in rate of this mixture be 5 - 300 weight section by the solid content to 100 weight section of this porous material or this reinforcing materials.

[0024]

[Function] In large pH field, the sulfo methylation object of the copolycondensation object with 1 ** phenolaldehyde condensate, the polyhydric phenol and/or the polyhydric phenol, and aldehyde condensate which has a methylol machine in the mixture of this invention is stable, it has room-temperature-setting nature, and a working life hardens it in response to a short time for a long time. Therefore, the porous material and composite material which mixed this mixture can also be efficiently fabricated by low-temperature heating. Moreover, the hardened material of this mixture is extremely excellent in flexibility, durability, thermal resistance, weatherability, etc.

[0025]

[Example]

One mol of [example 1] phenols, two mols of 37% formalin, The water 50 section is added to the 50 % of the weight aqueous-solution 100 weight section (they are only the section and **** below) of the initial copolycondensation object (C) which made 0.1 mols of resorcinols react to the initial condensate (A) of 1 ** phenolaldehyde to which 0.1 mols of caustic alkali of sodium and 0.3 mols of sodium sulfite were made to react, and by which sulfo methylation was carried out. After applying, making it dry for 80 degree-Cx 20 minutes and leaving [immersing and] it at a room temperature for 40 days for ten days for one day so that this solution may become the ten sections to the porous-material 100 section which consists of a polyester fiber with a thickness of 10mm, after melting uniformly, the result which changed and fabricated heat-and-pressure temperature conditions is shown in Table 1.

[0026] The result fabricated like the example 1 using the 50 % of the weight aqueous solution of the initial copolycondensation object (C) which it replaced [object] with the resorcinol and made 0.1 mols of 5-methyl alkyl resorcinols react to the initial condensate (A) of the [example 2] example 1 is shown in Table 1.

[0027] After adding the water 50 section to the initial condensate of 1 ** phenolaldehyde which was made to react, without adding sodium sulfite in the [example 1 of comparison] example 1 and by which sulfo methylation is not carried out using the 50 % of the weight aqueous solution of the initial copolycondensation object (C) to which the resorcinol was made to react

and melting in it uniformly, the result fabricated like the example 1 is shown in Table 1.
[Table 1]

試料	熱圧温度 (℃)	熱圧時間 (分)	成 形 状 態		
			1日後	10日後	40日後
実施例1	150	3	○	○	○
		1	○	○	○
	135	3	○	○	○
		1	○	○	○
実施例2	150	3	○	○	○
		1	○	○	○
	135	3	○	○	○
		1	○	○	○
比較例1	150	3	○	○	×
		1	○	○	×
	135	3	○	△	×
		1	○	△	×

Process-condition: Use a hot press and it is condensate application material with a thickness of 10mm respectively Heat-and-pressure temperature 150,135 ** It fabricated so that it might become in thickness of 2mm with the heat-and-pressure time 3 and the level for 1 minute.

○ : a condensate hardens completely and is fabricated in the uniform status.

○ : although fabricated in the uniform status, there is a somewhat flexible fraction.

**: Although a part of edge can be fabricated, a part for a core is blistering **.

×: Since the condensate is gelling, it cannot fabricate.

[0028] Although the neglect stability of a condensate gels during a store bad and a long-term store cannot be performed from the test result of Table 1 when the initial condensate by which sulfo methylation is not carried out is used, in the case where the initial condensate of this invention by which sulfo methylation was carried out is used, it turns out that it can fabricate enough even if a long period of time saves.

[0029] The initial condensate of 1 ** phenolaldehyde which made 0.3 mols of sodium sulfite add and react to one mol of [example 3] phenols, 1.8 mols of 37% formalin, and the condensate of 0.1 mols of caustic alkali of sodium and by which sulfo methylation was carried out (A), Two mols (270-290 degrees C of fractions) of the alkyl resorcinols which refined the Cher oil resorcinol independently obtained by dry distillation of the Estonia ** oil shale, Mix one mol of formalin, and 0.2 mols of caustic alkali of sodium 37%, it is made to react, and a polyhydric phenol and the initial condensate (B) of an aldehyde are obtained. Subsequently, the initial copolycondensation object (C) 100 section of pH 9.0 which above-mentioned polyhydric phenol and initial condensate of an aldehyde (B) are made to add and react to the initial condensate (A) of 1 ** phenolaldehyde by which sulfo methylation was carried out [above-mentioned], and was obtained is received. The 30 % of the weight aqueous solution which added the paraformaldehyde powder 20 section and added water further as a curing agent It is made to sink in so that it may become 20% of the weight of a coating weight to a corrugated board as a porous material.

The place which applied the polychloroprene adhesive and was molded into the polyurethane-foam side of the epidermis material which stuck the polyurethane foam on the elasticity chlorination vinyl sheet by heating under pressure for 2 minutes 60 degrees C after drying at 30 degrees C for 1 hour, The structure material of the good appearance without abnormalities, such as deformation of an elasticity chlorination vinyl sheet front face, and blistering, gloss, was obtained. Moreover, the aqueous solution had the pot life of 3 hours at the room temperature this 30% of the weight.

[0030] Since the 30 % of the weight aqueous solution which added the paraformaldehyde powder 20 section as a curing agent, and added water further was gelled in about 20 minutes at a room temperature to the 1 ** phenol, a polyhydric phenol, and initial condensate (C) of aldehyde 100 section of pH 9.1 made to react like an example 3 except [all] not adding sodium sulfite in the [example 2 of comparison] example 3 and it solidified, structure material was not able to be manufactured using the porous material.

[0031] Solubility when each first time condensate (C) obtained in the [example 4] example 3 and the example 2 of a comparison changes pH by the formic acid was obtained. A result is shown in Table 2.

[Table 2]

試 料	p H		
	7. 0	5. 0	3. 0
実施例 3 の初期縮合物	◎	◎	◎
比較例 2 の初期縮合物	◎	△	×

◎: it is melting uniformly completely with uniform liquid.

**: -- it becomes opaque liquid

×: A resin dissociates and solidifies.

[0032] Make one mol of [example 5] cresol, 1.5 mols of 37% formalin, and 0.2 mols of caustic alkali of sodium react, and consider as the initial condensate (A) of 1 ** phenolaldehyde, 0.3 mols of the crude alkyl resorcinols independently obtained by dry distillation of the Estonia ** oil shale and 0.1 mols of 37% formalin are made to react, and a polyhydric phenol and the initial condensate (B) of an aldehyde are built. Furthermore, the 50 % of the weight aqueous solution of the initial copolycondensation object (C) of pH 8.4 which made above-mentioned polyhydric phenol and initial condensate of an aldehyde (B), and 0.12 mols of sodium sulfite add and react to the above-mentioned initial condensate (A) of 1 ** phenolaldehyde is made into a porous material. Immersing and after making it sink in, 80 degrees C of good structure material, such as a dimensional accuracy and rigidity, were obtained, when it dried for 30 minutes, and the thermoforming of the 150 degrees C was subsequently carried out for 3 minutes and having been fabricated in thickness of 5mm so that it might become 50% of the weight on a polyurethane-foam sheet with a thickness of 15mm to the weight of this polyurethane-foam sheet.

[0033]

[Effect of the Invention] Therefore, the structure material of this invention has a long working life [harden / and / in ordinary temperature / it] compared with the structure material using conventional phenol resin etc. as a binder, and since its workability is good, its heat energy luminous efficacy in a manufacturing process improves. Moreover, excel in a deck watertight luminaire, a heat proof, weatherability, etc., and an intensity also improves with the combination with the reinforcing materials further. Moreover, it can denaturalize by synthetic resin or synthetic rubber, the structure material which had an intensity, rigidity, flexibility, and flexibility further is made, and, as for the initial condensate used for this invention, molding can really [with the mounting material impossible moreover conventionally / simultaneous] do possible structure material.

[Translation done.]